ZABER

ASR-E Product
User's Manual
Firmware 5.00 and up

Last Update: December 10 2015
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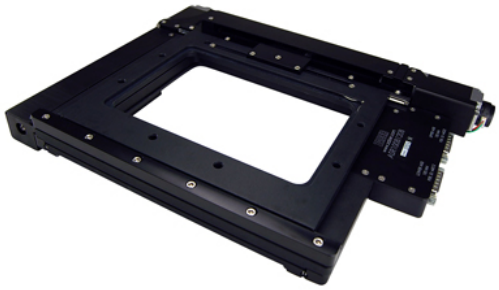


Table of Contents

Disclaimer **1**

Installation **2**
- Mounting 2
- Controller Connection 2
- Pinout for D-sub 15 Connectors (A-series and X-Series controllers and peripherals) 2
- Alternate Controllers 4
  - Motors 4
  - Home/Away Sensors 4

Operation **5**
- Installing and Removing ASR-E Inserts 5
- Setting Home and Away Sensors 5

Software **7**

Warranty and Repair **8**
- Standard products 8
- Custom products 8
- How to return products 8

Email Updates **9**

Contact Information **10**

Appendix A: Default Settings **11**

Appendix B: Device Specifications **12**

Disclaimer

Zaber’s devices are not intended for use in any critical medical, aviation, or military applications or situations where a product's use or failure could cause personal injury, death, or damage to property. Zaber disclaims any and all liability for injury or other damages resulting from the use of our products.

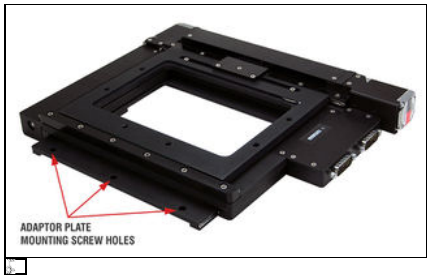
Installation

Mounting

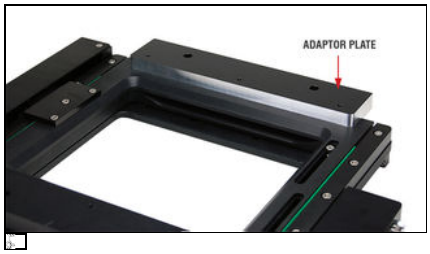
The ASR-E XY stage is mounted using adaptor plates. There are currently two different adaptor plates available:

- AP110 - for mounting to a standard M6 on 25 mm breadboard.
- AP111 - for mounting to Leica, Zeiss and Olympus microscopes.
- AP114 - for mounting to Nikon inverted microscopes.

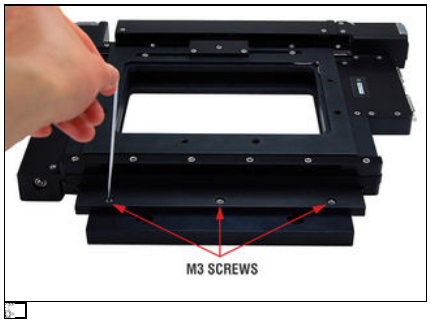
The adaptor plates are attached to the ASR-E using 3 M3 screws per plate. To install the adaptors, align them as shown in the pictures below and tighten the M3 screws. The stage will need to be plugged into the controller so that you are able to move the lower axis and gain access to the screw holes.



Position the lower axis such that you have access to the adaptor plate mounting screw holes.



Place an adaptor plate underneath the ASR base.



Install and tighten the M3 screws

Custom adaptor plates are available upon request. Please contact Zaber technical support at 1-888-276-8033 or contact@zaber.com for more information.

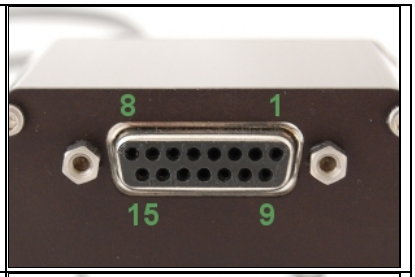
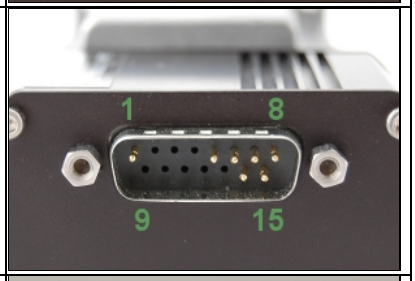
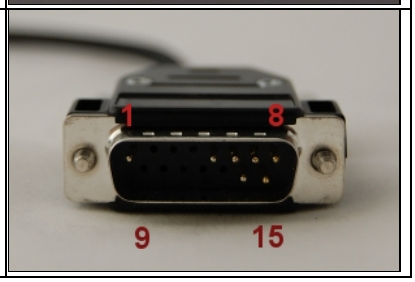
Controller Connection

The ASR microscope stages are designed to be controlled with any of Zaber's multi-axis X-Series or A-Series Stepper Motor Controllers. Zaber's controllers and peripherals are designed for ease of use when used together. Optimal settings for each peripheral (such as the default current, speed, acceleration, and limit settings) can be loaded by setting the peripheralid (T:66) on the controller. The peripheral ID is listed as the ID on the peripheral's label. A list of IDs is also available on the ID Mapping page. For more information on device operation, refer to the controller's user manual.

Using MC03 cables, connect the upper and lower axes of the ASR-E stage to the *MOTOR 1* and *MOTOR 2* connectors on the controller.

For reference, the pinout for the motor cable connectors is shown below:

Pinout for D-sub 15 Connectors (A-series and X-Series controllers and peripherals)

A- or X-series controller (female)	
T3 Peripheral (male)	
T4 Peripheral (male)	

Pin #	Function
1	+5V
2	Encoder Error ****
3	*reserved*
4	Away Sensor ***
5	Home Sensor
6	Ground
7	Motor B1
8	Motor A1
9	+5V *
10	Encoder A *
11	Encoder B *
12	Encoder Index **
13	Ground *
14	Motor B2
15	Motor A2

** encoder embedded peripherals only*
*** devices with encoders with index only*
**** devices with away sensors only*
***** devices with linear or direct-reading encoders only*

Alternate Controllers

The ASR-E may be controlled by any 2-phase stepper motor controller with limit sensor and 200 CPR rotary encoder input. **We do not recommend using your own controller unless you are familiar with how to control a stepper motor with hall sensor limit switches.** Damage to the stage due to incorrect wiring is not covered by warranty.

Motors

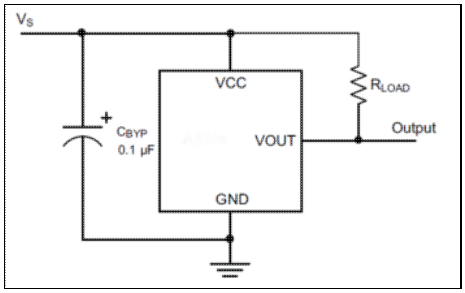
For motor information see the ASR-E product page

Home/Away Sensors

4 Hall effect sensors are used in the ASR as home and away sensors. Each axis has one home and one away sensor mounted to a single PCB. The Hall sensors used are part number A1120LLHLT-T made by Allegro. Click here for data sheet. Your controller should be configured so the stage stops immediately (quick deceleration) when the sensors are triggered.

- PCB wire colour code:
  - 3.6-24 Vdc input - red
  - Home signal - yellow
  - Away signal - white
  - Ground - black

The Hall sensor has an open-collector output. The default output is high impedance when the Hall sensor is not active. When the sensor detects a magnet, the Hall sensor pulls the output low to ground.



If you are not using a Zaber controller, ensure that your controller has a pull-up resistor on the output line of each Hall sensor as shown in the diagram. The bypass capacitor is optional, but may help to eliminate false triggering in noisy environments. The typical value for the pull-up resistor (R_{LOAD}) is 10k and for the bypass capacitor is 0.1uF to 1uF. The larger the capacitance, the better the noise filtering but the slower the response time.

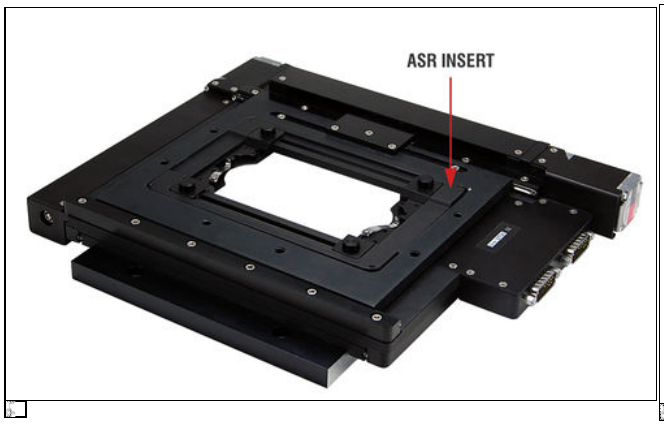
Operation

Most of the information you will need to operate the stage using the A-MCB2 controller can be found in the A-MCB2 user manual. The sections below provide some additional information that is specific to the ASR-E stages.

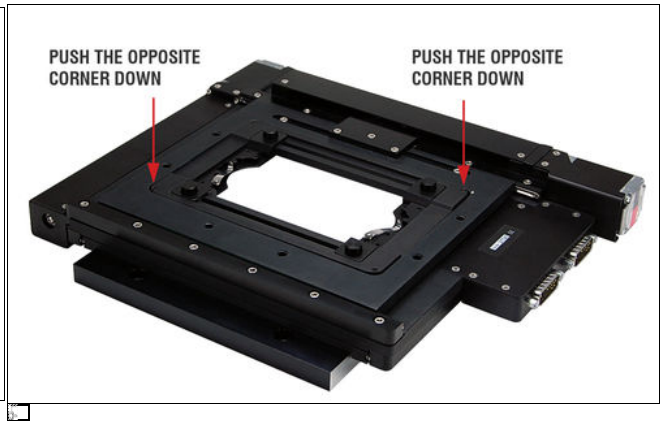
Installing and Removing ASR-E Inserts

The ASR-E is designed to accept 160 x 110 mm inserts. There are inserts available for mounting slides, petri dishes, well plates as well as for many other specific applications. To view the available inserts, please see our accessory page. The ASR-E inserts are denoted by a part number beginning with AM.

The inserts are held in place by a spring clip in one corner of the ASR-E aperture. To install an insert, place the one corner up against the spring first. While holding this corner down, push the insert towards the spring clip and snap the opposing corner into place. Removal is the reverse of this procedure.



To install an insert, first position the corner next to the spring clip as shown.



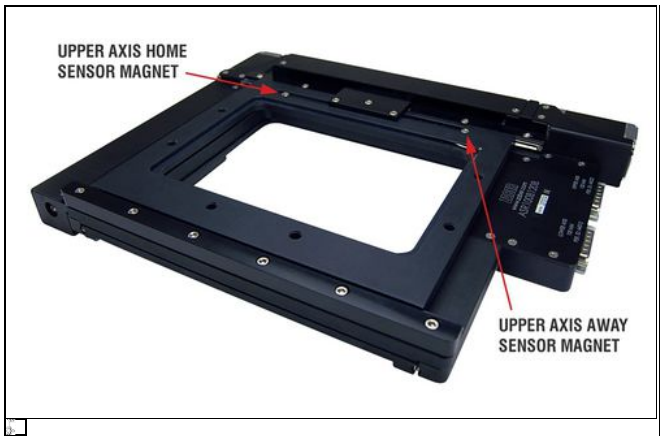
While holding down the corner next to the spring clip, push the opposite corner down.

For most applications, the spring clip should provide sufficient force to hold the insert in place, while still allowing quick changes between inserts. For applications requiring more secure mounting, custom inserts can be provided that can be secured to the ASR-E using 4 M2 screws.

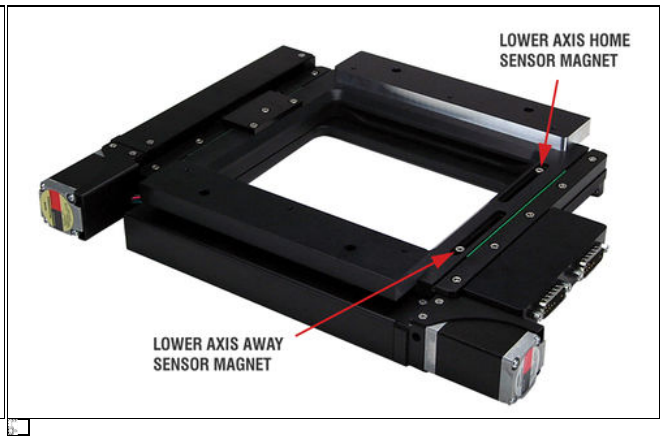
Setting Home and Away Sensors

The ASR-E provides adjustable travel limits for each axis. A home sensor sets the 0 position of each axis and an away sensor determines the maximum travel range. As long as the "limit_auto-detect" setting is enabled, each stage will not be able to move past these limits.

Limit adjustment is performed by moving the magnets which trigger the sensor. The limit switch magnets are attached to the bottoms of the limit adjustment screws shown in the pictures below.

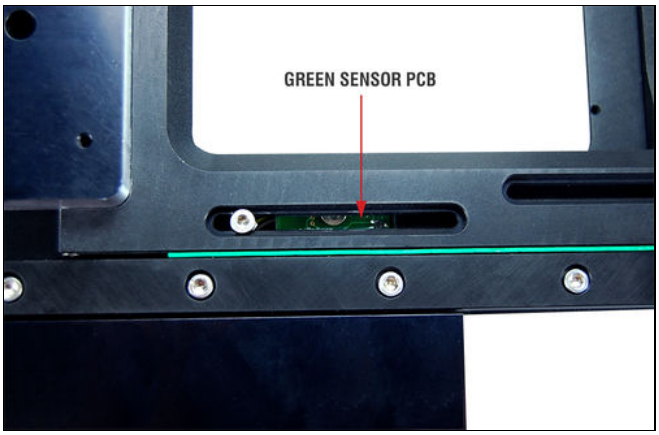


Upper axis limit switch magnets



Lower axis limit switch magnets

To adjust the limits, loosen the screws by about 1/2 turn, slide the screw to the desired location and re-tighten. Make sure that the green hall sensor PCB (visible through the magnet adjustment slots) always stays in between the limit screws.



When adjusting the limit switch magnets, ensure that the green sensor PCB remains in between two magnets.

Software

In addition to the regular software options available for all Zaber devices, the ASR-E is supported by Micro-Manager open source microscopy software. Micro-manager can be downloaded for free from the Micro-Manager website.

Warranty and Repair

For Zaber's policies on warranty and repair, please refer to the Ordering Policies

Standard products

Standard products are any part numbers that do not contain the suffix ENG followed by a 4 digit number. Most, but not all, standard products are listed for sale on our website. All standard Zaber products are backed by a one-month satisfaction guarantee. If you are not satisfied with your purchase, we will refund your payment minus any shipping charges. Goods must be in brand new saleable condition with no marks. Zaber products are guaranteed for one year. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

Custom products

Custom products are any part numbers containing the suffix ENG followed by a 4 digit number. Each of these products has been designed for a custom application for a particular customer. Custom products are guaranteed for one year, unless explicitly stated otherwise. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

How to return products

Customers with devices in need of return or repair should contact Zaber to obtain an RMA form which must be filled out and sent back to us to receive an RMA number. The RMA form contains instructions for packing and returning the device. The specified RMA number must be included on the shipment to ensure timely processing.

Email Updates

If you would like to receive our periodic email newsletter including product updates and promotions, please sign up online at www.zaber.com (news section). Newsletters typically include a promotional offer worth at least $100.

Contact Information

Contact Zaber Technologies Inc by any of the following methods:

Phone	1-604-569-3780 (direct) 1-888-276-8033 (toll free in North America)
Fax	1-604-648-8033
Mail	#2 - 605 West Kent Ave. N., Vancouver, British Columbia, Canada, V6P 6T7
Web	www.zaber.com
Email	Please visit our website for up to date email contact information.

The original instructions for this product are available at http://www.zaber.com/wiki/Manuals/ASR-E.

Appendix A: Default Settings

see our website

Appendix B: Device Specifications

For complete device specifications for ASR-E XY scanning stages, please see our website.

Specification	Value	Alternate Unit
Microstep Size (Default Resolution)	0.15625 µm	
Integrated Controller	No	
Recommended Controller	X-MCB2 (48 V) Recommended	
Travel Range	100 x 120 mm	3.937 "
Accuracy (unidirectional)	12 µm	0.000472 "
Repeatability	< 2 µm	< 0.000079 "
Backlash	< 4 µm	< 0.000157 "
Maximum Speed	85 mm/s	3.346 "/s
Minimum Speed	0.000095 mm/s	0.00000 "/s
Speed Resolution	0.000095 mm/s	0.00000 "/s
Encoder Type	Motor mounted rotary quadrature encoder	
Peak Thrust	95 N	21.3 lb
Maximum Continuous Thrust	95 N	21.3 lb
Guide Type	Crossed roller bearing	
Pitch	0.02 degrees	0.349 mrad
Roll	0.02 degrees	0.349 mrad
Yaw	0.005 degrees	0.087 mrad
Linear Motion Per Motor Rev	2.00 mm	0.079 "
Motor Steps Per Rev	200	
Motor Type	Stepper (2 phase)	
Motor Rated Current	670 mA/phase	
Motor Winding Resistance	9.2 ohms/phase	
Inductance	5.6 mH/phase	
Motor Rated Power	4.2 Watts	
Motor Connection	D-sub 15	
Mechanical Drive System	Precision lead screw	
Limit or Home Sensing	Magnetic, adjustable home and away sensors	
Axes of Motion	2	
Mounting Interface	Separate mounting adaptors available	

Operating Temperature Range	0 to 50 degrees C
RoHS Compliant	Yes
CE Compliant	Yes
Weight	3.0 kg